

STATE OF ILLINOIS
ILLINOIS COMMERCE COMMISSION

COMMONWEALTH EDISON COMPANY :

Petition for approval of delivery services tariffs and :
tariff revisions and of residential delivery services :
implementation plan, and for approval of certain :
other amendments and additions to its rates, terms, :
and conditions :

No. 01-0423

Surrebuttal Testimony of
CHRISTOPHER LEE CULP, PhD

Principal and Managing Director
CP Risk Management LLC

OFFICIAL FILE

I.C.C. DOCKET NO. 01-0423
Com ED Exhibit 54.0
Witness CULP
Date 11-6-01 Reponer 6724

ComEd Ex. 54.0

1 Q. Please state your name and business address.

2 A. My name is Christopher Lee Culp. The business address is 140 South Dearborn Street,
3 Suite 1500, Chicago, Illinois.

4 Q. Are you the same Christopher Culp who previously filed direct and rebuttal testimony in
5 this proceeding?

6 A. Yes.

7 Q. What is the purpose of your rebuttal testimony?

8 A. I will address some of the criticisms raised by Mr. Pregozen of my endorsement of
9 ComEd's theoretical use of the Miller model. I will reiterate that my argument for the
10 use of the model is not based on the realism of its assumptions but rather on its logical
11 coherence, the straightforwardness of the means by which assumptions and outcomes are
12 related to one another, and the widespread degree of the model's use in actual practice. I
13 will also respond to some of the specific issues raised in a more narrow context by Mr.
14 Pregozen.

15 Q. Please elaborate on what you meant in your testimony when you argued that models
16 should be evaluated "based on their practical ability to describe actual behavior, not the
17 realism of their assumptions."

18 A. A model should be chosen in the context of the present rate setting activity based on three
19 criteria. First, a model should be logically coherent. If A implies B and B implies C, then
20 A must imply C. Second, a model should be straightforward, which Mr. Pregozen has
21 reminded us by way of a cite to the *American Heritage Dictionary* means that the model
22 should not be circuitous, should be plain, and should be open. Logical coherence and

23 straightforwardness together imply that violations of the assumptions underlying the
24 model should have predictable and clearly interpretable results.

25 Finally, a model should be widespread in its use—*i.e.*, consistent with actual
26 behavior observed in the market by model users. Mr. Pregozen takes issue with my
27 endorsement of the Miller/Hamada models based on the fact that they are the most widely
28 used and straightforward, even taking the time to offer dictionary definitions for the
29 differences in “straightforward” and “accurate.”¹ I must say, however, that my use of the
30 word “straightforward” was not an accident. To be quite clear, I do not believe the best
31 way to choose an economic model is solely based on its predictive accuracy. “Actual
32 behavior” is not synonymous with “predictive accuracy.” “Actual behavior” means in
33 large part “actual use.”

34 One major reason to which I have testified already for choosing these criteria as
35 the basis for endorsing the Miller model is that the combination of logical coherence,
36 openness/straightforwardness, and widespread actual use make it hard to “tamper with”
37 such models in order to get a result you want to get. The Miller/Hamada models were not
38 chosen by ComEd because they yield a desirable result. They were chosen because they
39 are logical, straightforward, and significantly used in practice. Indeed, given my
40 testimony about the new risks to which ComEd is exposed, a cost of capital model based
41 on an approach like value-at-risk likely would have yielded a much higher estimate. Yet,
42 the value-at-risk approach to capital budgeting and cost of capital estimation is used at
43 only a handful of firms and thus would not have been appropriate in this case.

¹ Staff Exhibit 26, pp.12-13.

44 Note that none of the criteria above allow us to assess the quality of a model
45 purely based on the realism of the assumptions underlying that model. Numerous
46 financial models like the family of term structure models (Vasicek; Brennan and
47 Schwartz; Cox, Ingersoll, and Ross; etc.) have unrealistic assumptions underlying them,
48 but they enjoy widespread practical application (*i.e.*, are adopted by practitioners in their
49 actual behavior) anyway. This is in no small part due to their coherence and
50 straightforwardness.

51 Q. Mr. Pregozen describes your view of choosing a model as a “devil you know” view.² Do
52 you agree?

53 A. This is a misleading perspective of modeling because it implies that somewhere out there
54 is a model that is *not* a devil. Yet, *all* models—both theoretical and econometric or
55 statistical—are in the end an approximation of reality at least to some degree.

56 Q. How does Mr. Pregozen appear to be evaluating and choosing amongst models?

57 A. I am not certain. He states at one point that he opposes using the “ComEd Miller and
58 Hamada models for the purpose of setting utility’s cost of capital ... because the
59 predictions of those models are so at variance with reality”³ in the specific context of the
60 model’s implication for a 100% debt capital structure. He then also levels a series of
61 criticisms at the Miller and Hamada models that are directed more at its assumptions than
62 its predictive accuracy. These criticisms are summarized by his statement: “The ComEd
63 Miller and Hamada models are clearly inaccurate *because they incorrectly assume* that

² Staff Exhibit 26, p.14.

³ Staff Exhibit 26, p.6.

64 companies can borrow at the risk-free rate. [emphasis added]" ⁴ This implies that
65 predictive accuracy is not the issue, but rather the "correctness" of the model's
66 assumptions.

67 Q. Do you agree with him that the Miller model implies a 100% debt capital structure?

68 A. The fact that the M&M propositions with taxes can imply a 100% debt capital structure is
69 well-known.⁵ I do not disagree. But the existence of taxes is a violation of the M&M
70 perfect capital markets assumption. Once perfect capital markets is violated as an
71 assumption, however, other dimensions of that violation must be considered. For
72 example, insolvency is costly. Mr. Pregozen argues at several points in his testimony that
73 risky debt rates should be used in lieu of the risk free rate. And if the firm's debt is risky,
74 then financial distress and insolvency must be a possibility.

75 Assuming distress is costly—the same imperfect capital markets world in which
76 taxes exist—higher leverage raises a firm's expected financial distress costs. This
77 attenuates the tax advantage of debt, thus implying a capital structure that is *not* 100%
78 debt. The optimal capital structure of the firm that emerges under this limited set of
79 assumptions is the leverage ratio that equates the tax benefit of debt to the financial
80 distress cost of debt at the margin. Myers calls this the tradeoff theory of capital
81 structure.^{6,7}

⁴ Staff Exhibit 26, p.13.

⁵ Miller, *op. cit.*, p. 112, and Franco Modigliani and Merton H. Miller, "Corporate Income Taxes and the Cost of Capital: A Correction," *American Economic Review* Vol. 53, No. 3 (June 1963).

⁶ Stewart C. Myers, "The Capital Structure Puzzle," *Journal of Finance* Vol. 39, No. 3 (July 1984).

⁷ Note that I am not endorsing this theory of optimal capital structure, but am merely stating the implications in response to Mr. Pregozen's question of the consistency in my line of reasoning.

82 Q. You place a lot of weight on the assessment of a model based on its ability to describe
83 actual behavior, which you interpret in large part as widespread actual use. Do you have
84 any evidence that the Miller and Hamada models are widespread in their practical use?

85 A. Surveys of how firms undertake capital budgeting decisions have been periodically
86 undertaken and published in the academic literature, and these surveys provide
87 confirmation of the degree to which the Miller/Hamada approach has been adopted.

88 An early survey by Schall, Sundem, and Geijsbeek of the senior financial officers
89 at 189 responding firms sheds light on the applicability of the Miller and/or Hamada
90 models in several ways.⁸ 56% of the respondents use the net present value ("NPV")
91 method for capital budgeting, and over 86% of respondents use either the NPV method or
92 an internal rate of return ("IRR") method. Proper use of the NPV method involves
93 discounting at WACC, and most IRR comparisons are made relative to WACC. Use of
94 these methods thus is tantamount to indicating the use of WACC as a measure of a firm's
95 cost of capital.

96 When asked about discounting explicitly, 46% of the respondents said they use
97 WACC for discounting purposes, and 88% of the respondents made adjustments for
98 taxes. Attempts by firms to classify themselves directly in risk classes were significantly
99 less utilized; 77% of respondents did not rely on any risk class system of classification.

100 Q. How is the use of WACC support for the Miller/Hamada models?

⁸ Lawrence D. Schall, Gary L. Sundem, and William R. Gleijsbeek, "Survey and Analysis of Capital Budgeting Methods," *Journal of Finance* Vol. 33, No. 1 (March 1978).

101 A. M&M Proposition II from which the Miller model is derived is essentially just a
102 restatement of WACC. A firm that is discounting with WACC is almost certainly using
103 the Miller adjustment.

104 Q. Is there any more recent evidence?

105 A. Yes, a similar study was undertaken by Graham and Harvey that was published in the
106 past few months.⁹ The sample included 392 financial executives from Fortune 500 firms,
107 members of the Financial Executives Institute, or both. The results were similar to the
108 earlier survey. 74.9% of the respondents always or almost always use the NPV method
109 for capital budgeting, and 75.7% always or almost always use IRR. As noted, this
110 implies the use of a WACC for discounting purposes.

111 73.5% of respondents in the Graham/Harvey survey use the CAPM to estimate
112 their costs of equity capital. Because the Hamada model adjusts the CAPM for leverage,
113 the use of the CAPM to get equity cost of capital estimates implies the use of the Hamada
114 model to get WACC.

115 Q. In the survey evidence you cite, you claim that the use of the NPV models implies a
116 WACC formulation and supports the use of the Miller/Hamada models. Because those
117 models as published rely on the risk free rate, do you mean to say that these survey
118 results tell us that all firms doing NPV analysis are using the risk free rate for their
119 leverage adjustments?

120 A. There is no way to tell, but very likely they are not. Respondents may well be
121 substituting in risky debt rates instead of the risk free rate.

⁹ John R. Graham and Campbell R. Harvey, "The Theory and Practice of Corporate Finance: Evidence from the Field," *Journal of Financial Economics* Vol. 61 (2001).

122 Q. Doesn't that mean they are not using the Miller or Hamada models?

123 A. Not at all. That means they are using the Miller/Hamada models with different inputs
124 than prescribed by the original assumptions, presumably to address some of the known
125 biases with which Mr. Pregozen is so concerned. Many financial models (such as the
126 cost of carry model for forward prices and the binomial option pricing model) are derived
127 and expressed in terms of the risk free rate, but a firm's actual borrowing rate is used to
128 do the estimation.

129 Q. In your references to the widespread usage of the Miller and Hamada models, Mr.
130 Pregozen claims that your argument rests on "unnamed people." Can you name some
131 people who argue that it is better to stick with the Miller model?

132 A. Mr. Pregozen also adds that "Clearly, Brealey and Myers are not among them." At least
133 with respect to Myers, this is both wrong and ironic. Wrong because Prof. Myers has
134 previously advocated the use of a traditional Miller model WACC measure, and ironic
135 because he has endorsed the Miller model specifically in the context of how cost of
136 capital estimation methods should be used in utility rate setting cases.¹⁰ Myers refers to
137 the use of the Miller model for estimating the cost of equity capital in a rate context as
138 "the straightforward approach."¹¹ He admits that there are probably "better approaches,"
139 but nevertheless advocates the use of the Miller model because it is simple,
140 straightforward, and reasonably robust. In referring to the Miller model in the rate setting
141 context, he states, "Only the most obvious, 'straightforward' approach was investigated

¹⁰ Stewart C. Myers, "The Application of Finance Theory to Public Utility Rate Cases," *Bell Journal of Economics and Management Science* Vol. 3, No. 1 (Spring 1972).

¹¹ Myers, *op. cit.*, p. 94.

142 here. But this approach is logically sound and practical. By and large, the objections to
143 straightforward approaches can be answered satisfactorily.”¹²

144 Q. Can you give an example of an objection to the straightforward Miller model that Myers
145 claims can be answered satisfactorily?

146 A. Myers is referring to the general objections to the M&M propositions, one of which, for
147 example, is the assumption of equal and riskless borrowing costs.

148 Q. You argued in your rebuttal testimony that the “implications of the Miller model do not
149 fundamentally change when we relax the assumption of equal borrowing costs.” Mr.
150 Pregozen dismisses this as an irrelevant attempt to change the debate. Do you agree?

151 A. Mr. Pregozen states earlier in his testimony that “both Modigliani and Miller and Brealey
152 and Myers recognize [that] MMII can be modified to incorporate risky corporate debt.”¹³
153 It would appear that we have no difference of opinion on this, so his suggestion that I am
154 “changing the debate from the ability of ComEd’s Miller and Hamada models to
155 accurately measure (sic.) the effect on the cost of common equity of changes in financial
156 leverage to the *implications* of the Miller and Hamada models....”¹⁴ by raising this issue
157 is difficult for me to interpret.

158 Q. Do you have any further responses to Mr. Pregozen?

159 A. Yes. In criticizing my example of a situation where higher debt service burdens could
160 lead to a higher expected return on equity in the presence of agency costs, Mr. Pregozen
161 asserts that “common equity investors would rather a company waste a given amount on

¹² Myers, *op. cit.*, p. 94.

¹³ Staff Exhibit 26, p. 5.

162 uneconomic interest payments than other uneconomic expenditures.” He then states that
163 “[t]he illogic of Dr. Culp’s assertion is so clear that it requires no further explanation.”¹⁵

164 I do not believe that our disagreement on this matter is central to the matter at
165 hand, so I will not spend any length of time responding to it. I would simply say that
166 disbursements made to security holders of a firm are hardly *uneconomic* if they are made
167 in lieu of internal expenditures that *would be* uneconomic. Returning money to owners
168 and creditors to a firm is anything but “uneconomic.” I elaborate on how these “agency
169 costs” can affect capital structure and the firm’s risk management process in pp. 112-187
170 of my text *The Risk Management Process* (Wiley, 2001).

171 Q. Does this conclude your surrebuttal testimony?

172 A. Yes.

¹⁴ Staff Exhibit 26, p. 10.

¹⁵ Staff Exhibit 26, p. 12.